SubSeries 6i,
SubSeries 5i,
SubSeries 1,
Powered Subwoofers

OWNER'S GUIDE

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psb SPEAKERS

I. IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. WARNING: To reduce the risk of fire or electric shock, this apparatus should not be exposed to rain or moisture and objects filled with liquids, such as vases, should not be placed on this apparatus.
16. To completely disconnect this equipment from the mains, disconnect the power supply cord plug from the receptacle.
17. The mains plug of the power supply cord shall remain readily operable.

The lightning flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

Notes on environmental protection

At the end of its useful life, this product must not be disposed of with regular household waste but must be returned to a collection point for the recycling of electrical and electronic equipment. The symbol on the product, user's manual and packaging, point this out.

The materials can be reused in accordance with their markings. Through re-use, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment.

Your local administrative office can advise you of the responsible waste disposal point.

II. INTRODUCTION

PSB subwoofers are designed to provide the flattest possible frequency response, full bass extension, low distortion and high output. Frankly, these are characteristics that most manufacturers would strive for. Our years of experience and our sophisticated design and measurement tools allow us to achieve ideal subwoofer performance. Beyond these characteristics there are a few other parameters that we uniquely feel are very important in the design of a subwoofer. First and foremost it is important to us that a PSB subwoofer be *musical.* In this era of home theater this might at first seem out of step, but we believe that a musical subwoofer will also sound the most natural when playing movie soundtracks. Furthermore, an ideal subwoofer should have the ability to play musically even under conditions of overload or stress. No subwoofer is so large with its limits so great that it can never be overloaded, especially with modern movie soundtracks. For this reason PSB subwoofers incorporate very intelligently applied proprietary limiting circuitry to prevent audible overload.

The limiting circuitry of all PSB subwoofers is a combination of peak limiting circuits that hold amplifier signal swing to the point just short of the amplifiers clipping, and compression circuitry that will come in under conditions of long term overload and reduce the amplifiers gain. The trick is to apply these circuits in such a way that they don't squeeze the life out of the music or movie soundtrack, to allow the dynamics to get through while preventing gross distortion. We do this by being mindful of the dynamics of music and carefully tailoring the time constants of the circuits to that of music. For example, it is known that most music is performed with a beat of 80 to 140 beats per minute. Our test signals are configured to follow this timing and allow maximum transient effect without distortion on sustained tones.

We go to great lengths to reduce any mechanical noises our subwoofers may make. Woofers are designed never to bottom harshly. Ports have large radius end flares to reduce noise from turbulence. Cabinets and amplifiers are designed so that no air leaks (which can contribute minute amounts of noise) are possible. All of our designs are exhaustively tested. A subwoofers design isn't complete until the sub's amp and woofer can survive a 15 hour test of being driven continuously to maximum output.

SubSeries 1

The SubSeries 1 has a few unique features worth mentioning. We have mounted Volume and Crossover controls on the front of the cabinet. Most subwoofers are tucked away in a dark corner and once in place it can be very inconvenient to access the controls. Placing volume and crossover knobs on the front of the cabinet will allow you to adjust these most important functions more conveniently. Despite its modest price the SubSeries 1 contains a simplified version of our two part limiting circuit and a 100 watt class AB amplifier.

SubSeries 5*i*

The SubSeries 5*i* has more power and a larger bass unit than the SubSeries 1. It also has a very different Class H design for its power amplification. Class H is a special high efficiency amplifier design. Briefly, audio amplifiers are inherently inefficient because they are designed to have the capability of delivering great output power yet spend most of their life delivering fairly low power. Their output devices must deliver current while withstanding the high power supply "rail" voltages needed for peak outputs. With a Class H design the rail voltages are *not* constant. They swing high when the music demands it and stay low during quiet passages. This is achieved by a sophisticated high frequency switching power supply. Power dissipated as heat is greatly reduced and more power is available per dollar of cost ·A second benefit is that they tend to have high peak power relative to their steady state power. The SubSeries 5*i*, for example, has 150 watts continuous but is capable of 450 watt peaks. The result is a subwoofer capable of the great transients required by dynamic music and explosive sound effects.

SubSeries 6*i*

The SubSeries 6*i* has a design much like the 5*i* but with larger drive units and greater power for even more awesome output. In the words of our engineering staff it "Cranks pretty good."

Additional features of the 6*i* are its high and low level passive and active filtering circuits that allow greater flexibility in installation.

Whichever PSB subwoofer you have chosen, we hope that you appreciate the attention to detail that has gone into its design and, of course, that you enjoy using it. Please take the time to read the following sections about the placement of your subwoofer, and its connections and adjustments.

We suggest you save the original carton and packing materials, at least for an initial period. Should you ever need to ship or store your PSB subwoofer, it is the best packaging in which to do so.

III. QUICKSTART

If you cannot wait to hear your new PSB subwoofer: Turn off all other components, and follow one of the connection diagrams. Connect the supplied power cord to the AC power socket. Set the PSB subwoofer volume control to its minimum position (counterclockwise), then plug the subwoofer into an active AC outlet. The same receptacle as the rest of your audio/video system or another on the same electrical circuit should be used to avoid ground hum. Set the subwoofer's Sub Cut-Off Frequency control to its midpoint, and the phase switch to 0°. Flip the Power Switch to the on position. Play a bass-rich program source, and slowly bring up the Sub Volume control (clockwise) until the subwoofer contributes a natural level of low frequency sound. Now please read the rest of this guide and fine-tune your installation accordingly—it will be time well spent!

IV. FEATURES, CONTROLS, AC POWER

A. SUB VOLUME CONTROL

Adjusts the output level of the PSB subwoofer only: This is not intended as a day-to-day volume control. See "VII. Setup Calibration"

The PSB subwoofer includes designed-in dynamic-range protection: it is virtually impossible to overdrive the subwoofer, regardless of volume setting or the demands of the program material. Where even higher levels of low frequencies are required, a second PSB subwoofer can provide a significant gain in total bass levels.

D. SUB CUT-OFF FREQUENCY CONTROL

Adjusts the high-frequency roll-off of signals sent to the subwoofer. Continuously variable from 50Hz to 150Hz for precise matching of subwoofer bass reproduction with the main (left and right) stereo speakers. See "VII. Setup Calibration"

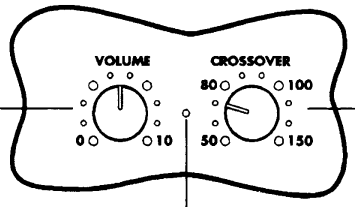


Figure 1
(located on the front of the subwoofer)

B. ON INDICATOR LIGHT

The light is located between the control knobs. With both the 120 and 230 volt versions, the subwoofer is initially in stand-by mode awaiting the presence of an audio signal. When the subwoofer receives an audio signal the On indicator will illuminate. At the end of the audio signal the subwoofer will stay on for approximately 15 minutes.

E. HIGH/SPEAKE LEVEL TERMINALS

Connect the PSB subwoofer to receivers or integrated amplifiers equipped with speaker outputs only. See "VI. Connecting The Subwoofer to Your Audio System".

F. AC POWER SOCKET

Supplies AC power to the PSB subwoofer. Connect the supplied power cord to the AC power socket. Plug the power cord into any standard wall outlet. With 230 volt versions, in some countries it may be necessary to replace the power cord to meet the standards in use locally.The same receptacle as the rest of the system or another on the same electrical circuit should be used to avoid ground hum.

C. AC POWER CONNECTION

The PSB subwoofer has its own self-contained amplifier and thus requires AC power (keep this in mind when selecting a location). You may plug the power cord into any standard wall outlet and leave the connection in the wall as the PSB subwoofer draws extremely little current when idle. You may want to unplug your PSB subwoofer when it will not be used for an extended period such as a vacation.

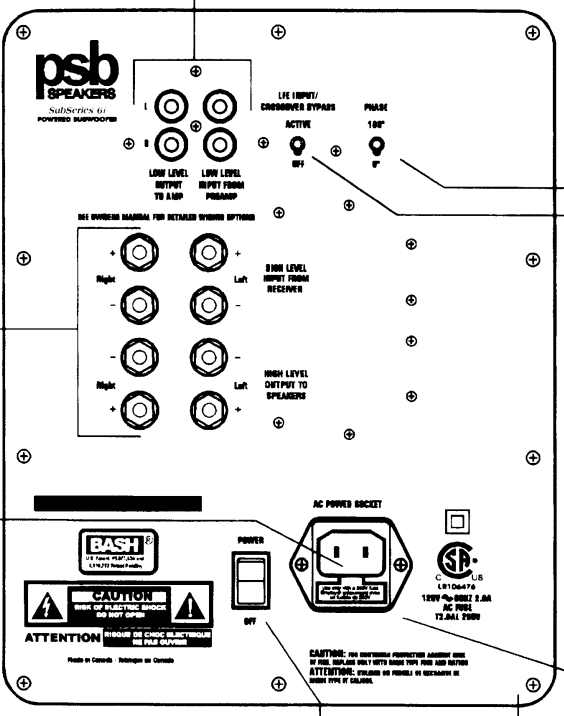


Figure 2

SubSeries 6i back plate used for illustration

G. POWER SWITCH

The Power Switch turns the PSB subwoofer on and off. As the subwoofer draws only an extremely small current when idle, this may be left normally on and turned off only when you do not expect to use the subwoofer for an extended period. The Power Switch must be in the on position for normal operation.

H. AMPLIFIER PANEL

The metal provides cooling for the PSB subwoofer's internal amplifier by radiating heat produced in normal operation. Allow air circulation, including at least four inches clearance from wall or furnishings.

I. LOW/LINE LEVEL JACKS

Connect the PSB subwoofer to a separate-component preamplifier, or to an integrated amplifier or receiver with preamplifier-out/main-in facilities, at line level. See "VI. Connecting The Subwoofer to Your Audio System".

J. PHASE SWITCH

Selects the subwoofer output phase between in-phase (0°) and out-of-phase (180°), to compensate for the low to mid bass acoustic effects of different placement locations and listening rooms. See "VII. Setup Calibration".

K. LFE INPUT/CROSSOVER BYPASS SWITCH

When active, the subwoofer variable low pass filter is bypassed so that this function can be accomplished by the low pass filter within a receiver/processor. See "VII. Setup Calibration".

L. EXTERNAL FUSE

When you turn on the subwoofer and there is no LED light and/or sound, please check the fuse (accessible from the rear panel) to ensure it is electrically intact. The fuse could have become broken during transit. A spare fuse is contained within the fuse holder compartment behind the inscribed text. Use a wide slot screwdriver to pry the fuse holder compartment from the AC power socket. If it is necessary to replace the fuse, use a fuse equivalent to the type and rating of the fuse shipped with the product. See the specifications page at the end of the manual for a detail description of the fuse required for your model of subwoofer.

V. ROOM ACOUSTICS, SUBWOOFER PLACEMENT, MULTIPLE SUBWOOFERS & CONTROL SETTINGS

Room Acoustics

If you are critical about low-frequency response, there's quite a bit of useful experimentation you can do, especially in combination with the crossover, level, and phase controls of our subwoofers.

Since the earliest days of high fidelity, one of the main challenges for the designers of speakers, and of their users, has been management of the lowest frequencies—the deep bass. Many of the most notable developments in speaker design have been made with a view to getting more bass output from smaller boxes.

One consideration is the size of the listening room. The larger the volume of air a speaker must excite, the more acoustic output you will require from it to achieve the sound levels you want. In any environment, sounds attenuate as you move farther away from their source, but in smaller rooms that tends to be offset by reinforcement from wall reflections. The larger the space is, the farther the sound has to travel both to reach the reflecting surfaces and then to get to your ears, which means it has to be louder to begin with.

With traditional full-range speakers, that involves an intricate matching act between amplifier power, speaker sensitivity, impedance and power handling. But the bulk of the power goes to reproducing bass, so the use of powered subwoofers and separate midrange/treble satellites both allows you to be conservative in the amount of power your main amplifier produces, and ensures a good match between the low-frequency amplifier and the woofer it is paired with.

After size, the most important aspect of a listening room is its shape. In any room, sound reflects off the walls, ceiling, and floor. If the distance between two opposite parallel surfaces is a simple fraction of the wavelength of a particular frequency, notes of that frequency will bounce back and forth in perfect phase—an effect called a standing wave or room mode.

At some point in the room, this note will be reinforced substantially; at others it will cancel out almost entirely. If the prime listening seat is placed at either of these locations, the note will be a horrible boom or virtually non-existent. The standing waves are different between floor and ceiling, side walls, and end walls, unless any of these dimensions are the same. An ideal listening room would have no parallel surfaces—an unusual situation, to say the least—so that such waves would not establish themselves. The worst kind of room is a perfect cube.

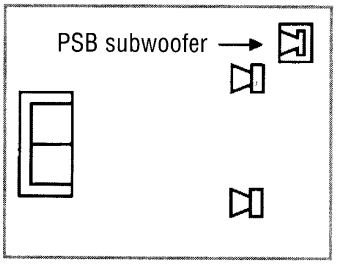
Almost all rooms are susceptible to some standing waves at low frequencies, but their effects can be minimized by careful positioning of both the speakers

and the listening seat. Moving either of these even a few inches is sometimes enough to cure—or create—an intolerable sound. The only way to find out what works best is by experimentation.

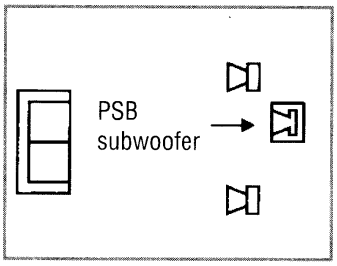
With full-range speakers, the range of places you can put the speakers and still get proper imaging may be fairly limited, and some of these positions may result in standing waves that can't be tamed. Things are more controllable through the use of a subwoofer or two. Positioning of the bass speakers has almost no impact on imaging, so a subwoofer can be located with only standing waves in mind.

Subwoofer Placement

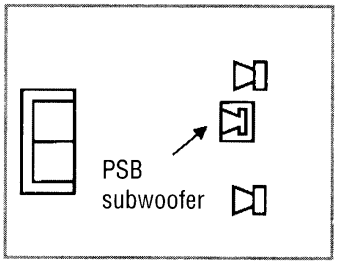
There is no argument among audiophiles that the loudest bass output from a subwoofer comes from corner placement. The natural megaphone-like flaring outward of walls from a room corner focuses low frequencies—giving them no place to go but toward you. In the case of subwoofers, there is no automatic penalty in overall balance for this maximal bass, since your main speakers can be located elsewhere. It still may be too much bass for your room or (more particularly) your favorite listening spot in the room, but unless you are seated in a "null" spot, where sound from the sub is cancelled or diminished by out-of-phase reflections from elsewhere, there should be plenty of bass from corner placement.



Most bass output; least even bass response.



Moderate bass output; more even bass response.



Lowest bass output; most even bass.

If you are seated in such a null spot, your only real choices are generally to move either the subwoofer or your listening position until bass returns to the point that satisfies. Cranking up the level control or changing the crossover point almost certainly won't help much. But flipping the phase control 180 degrees sometimes may make a difference, especially if the null is a product of cancellations caused by interaction with low frequencies from your main speakers.

If you are in the opposite sort of situation, where direct and reflected bass waves converge in phase and produce a strong peak at your listening location, you can—if you like—deal with that both with changes in placement or in the position of your sub's level control (or, less likely but possible, the crossover frequency chosen). We say "if you like" because there is no such thing as too much bass for some listeners, and we don't want to be dogmatic. You are defi-

nitely the one who has to be pleased, unless your Significant Other chimes in to the contrary.

As you go outward from the corner along one wall or another, the general consensus (with which we tend to agree) is that while bass output diminishes somewhat, it also becomes more uniform throughout the room, with fewer of the "standing waves" that produce peaks and nulls at various points.

Chances are things won't be so simple, so the best method for positioning a subwoofer, although a rather undignified-looking one, is to put the subwoofer in your listening chair, then play music with lots of bass through the system something with steady low frequencies (such as organ music) or continuous test tones, not movie material. Move around the room and note where the bass sounds best; if you place the subwoofer there and yourself in your chair, you should get the same bass performance. Bear in mind that the test only works if you have your ears as high off the floor as the subwoofer will be, so don't be afraid to crawl around. A recommended starting point for the placement of this subwoofer would be in either of the front corners of the room (on either side of the main speakers).

Multiple Subwoofers—Why Two Subs Are Better Than One

Since the objective of most people who buy subs is to make sure of plentiful low frequencies, the only situation most of us will run into that makes subwoofer placement really difficult is the factor we all fear—the "bad" room that just won't let you get satisfying amounts or quality of bass. There are rooms with troublesome dimensions, especially as you approach a perfect cube (with a closed door). There is unlikely to be any combination of speaker and listener position that will be free of obvious acoustic anomalies.

In such a case, the best way to iron out those anomalies is with two subwoofers, placed carefully to work with each other. This can also be true when the problem is too much, or too uneven, bass. The overall system needs all the help it can get, and that often means the use of two subwoofers, each one of which corrects for the acoustic problems excited by the other. For excellent results from this solution, the two subs don't have to be identical. It may be fine, in fact, to use two lesser subs to equal the performance of one with stronger specs.

Recent studies have shown that an excellent way to position two subwoofers is with each in the center of opposite walls. That is, with one in the center of the front wall and a second in the center of the back. Alternatively, try one in the center of each side wall.

The same "crawl around the room" method as previously described should be used for determining the location of the second subwoofer, except in this instance one is listening for the minimum amount of bass output. This is a recommended starting point for determining the best placement for your subwoofer(s).

Control Settings

Once a reasonably smooth response has been achieved by careful positioning of the subwoofers, the overall performance can be fine-tuned by means of the controls found on the speaker. An important one is the low-pass filter, which controls the upper limit of the subwoofer's frequency range. This should be set high enough to overlap the low frequency cutoff of the satellite speakers, but not high enough to localize specific sounds from the sub.

If the frequency response of your satellite speakers is such that the subwoofer's low-pass filter must be set higher than about 80Hz in order to avoid gaps in the overall system response, then you might well be able to localize specific sounds from the sub. This can be very distracting when these sounds appear to come from beside or behind you. One solution is to make sure the subwoofer is in the front of the listening area; another is to use multiple subwoofers to make such sounds more diffuse.

Subwoofers also offer a phase control so the upper frequencies they produce will not cancel out the lower frequencies of the satellites. A judicious tweaking of this control can pay major dividends in spectral smoothness in the crossover area. Phase changes with frequency, however, so these controls may need readjusting every time you vary the cutoff frequency.

Also adjustable is the overall level of the subwoofer's output. Many users tend to set this too high at first, in an effort to achieve truly impressive bass. Again, smooth response is the aim, and it may well be that, if you use them, two subwoofers end up being set differently—if, for example, one is in a corner and the other is not. It's all part of the overall-balancing act that is bass management in real rooms.

We get virtually no inquiries about subwoofer placement from customers, which is a good indication that it's not something over which people lose much sleep. A good subwoofer is such a pleasure when used with a good main speaker that enjoyment is definitely the rule.

VI. CONNECTING THE SUBWOOFER TO YOUR AUDIO SYSTEM

There are several ways to connect a subwoofer into a system. For best results overall, we recommend using **Low/Line Level** connections.

When making a **Low/Line Level** connection, be sure to follow the coding on the cables to maintain left-to-left and right-to-right. Use high quality, well-shielded, low capacitance RCA cables of minimal necessary length, to avoid picking up noise in the cable runs. When making a **High/Speaker Level** connection, in addition to maintaining left-to-left and right-to-right, be sure to use the coding of the pair of wires in each speaker cable to maintain phase—+/red/rib/writing to

+/red/rib/writing and -/white/smooth/clear to -/white/smooth/clear. We recommend minimum 16 gauge wire and, for longer runs, larger (lower gauge) wire.

A. THE SUBSERIES™ 1

1. **Connecting Home Theater Equipment (SEE FIGURE 3, page 16)**: You can use a single RCA cable to connect the **Subwoofer Output** of your receiver, integrated amplifier, or preamplifier to either right or left side of the **Low Level Input** on the subwoofer.

   Home Theater receivers, integrated amplifiers, surround sound processors, and preamplifiers usually have a special **Subwoofer Output** to provide the optional (Dolby Digital 5.1) Low Frequency Effects (LFE) Channel present on many movie and other programming sources. To reproduce these deep-bass effects (when they are present), supplementing the bass information in the main channels, this output must be connected to the subwoofer.

   The subwoofer output/LFE signal is filtered by most receivers/processors. The subwoofer's variable low pass filter is usually not required and should be bypassed by switching the LFE Input/Crossover bypass switch to active only if the receiver/processor subwoofer/LFE output is low pass filtered. **The default position for this switch is off.**

   With some Home Theater electronics and settings, connecting the **Subwoofer Output** does not provide the low frequencies from normal stereo music through the subwoofer. If this is true of your system, you can make two connections. First, connect the **Subwoofer Output** from the electronics to the right or left side of the **Low Level Input** of the subwoofer, as described above. Then also connect the **High Level Output** from the electronics to the **High Level Input** of our subwoofer, as described below. When listening to music using **High Level Input**, set the LFE Input/Crossover bypass switch to the off position. The switch would usually be set to active whenever the receiver/processor's **Subwoofer Output** is used during playback of movies. Most Home Theater electronics will not require this second connection, which, if not required, will produce greater bass than intended.

2. **Connecting Stereo Equipment Using Low/Line Level (SEE FIGURE 4, page 17):** If your receiver or integrated amplifier has preamplifier outputs, or if you are using a separate preamplifier, the preferred connection is from the **Preamplifier Output** of the electronics to the **Low Level Input** of the subwoofer. Use a dual RCA audio cable.

3. **Connecting Stereo Equipment with High/Speaker Level (SEE FIGURE 5, page 18):** You also can get excellent sonic results by connecting the **High/Speaker Level Output** of your receiver, integrated

amplifier or power amplifier to the **High Level Input** of the subwoofer. Use standard speaker cable and maintain polarity + –, as well as right and left side.

Speaker wires can be run onwards from the subwoofer directly to the main speakers. This replaces running wires from the receiver or amplifier to the main speakers. Twist the ends of each input wire from the electronics together with the corresponding wire to the speakers and insert them both into each corresponding input binding post of the SubSeries *i*. Be sure to avoid all contact between wires into the separate binding posts.

B. THE SUBSERIES™ 5*i*

1. **Connecting Home Theater Equipment (SEE FIGURE 3, page 16):** Please see the instructions for the SubSeries 1.

2. **Connecting Stereo Equipment using Low/Line Level (SEE FIGURE 4, page 17):** For this preferred connection, please see the instructions for the SubSeries 1. Additionally, you may need to use Y-connectors at the **Preamplifier Output** to also send signals to the **Power Amplifier/Main Input**.

3. **Connecting Stereo Equipment with High/Speaker Level (SEE FIGURE 5, page 18):** You also can get excellent sonic results by connecting the **High/Speaker Level Output** of your receiver, integrated amplifier or power amplifier to the **High Level Input** of the subwoofer. Use standard speaker cable and maintain polarity + –, as well as right and left side.

   High/Speaker Level Output from the subwoofer allows speaker wires to be run onwards easily from the subwoofer directly to the main speakers. This replaces running wires from the receiver or amplifier to the main speakers. The signals from the SubSeries 5*i* to the main speakers are looped through, full-range.

C. THE SUBSONIC 6*i*

1. **Connecting Home Theater Equipment (SEE FIGURE 3, page 16):** Please see the instructions for the SubSeries 1.

2. **Connecting Stereo Equipment using Low/Line Level (SEE FIGURE 4, page 17):** If your receiver or integrated amplifier has preamplifier outputs, or if you are using a separate preamplifier, the preferred connection is from the **Preamplifier Outputs** of the electronics to the **Low/Line Level Inputs** of the subwoofer. Use a dual RCA audio cable and maintain right and left. (You may need to use Y-connectors at the preamplifier outputs to also send signals to the **Power Amplifier/Main Inputs**.)

Connecting the **Low/Line Level Outputs** from the subwoofer back to the **Power Amplifier Inputs** is an important option. The **Low/Line Level Inputs** of the subwoofer are internally processed through an active high pass filter (at 12dB/octave below 80Hz) to the **Low/Line Level Outputs** of the subwoofer. Connecting the **Low/Line Level Outputs** from the subwoofer back to the **Power Amplifier Inputs** delivers the processed signal, with reduced low frequency content, to the main speakers. With less low frequency demands, the main speakers can play louder. Particularly with smaller and/or less efficient main speakers, relieving speakers other than the subwoofer of the demands of reproducing low frequencies will allow greater sound output and dynamic capabilities from the other speakers and from the system overall.

3. **Connecting Stereo Equipment with High/Speaker Level (SEE FIGURE 5, page 18):** You also can get excellent sonic results by connecting the **High/Speaker Level Outputs** of your receiver, integrated amplifier or power amplifier to the **High/Speaker Level Inputs** of the subwoofer. Use standard speaker cable and maintain polarity, as well as right and left.

   High/Speaker Level Outputs from the subwoofer allow speaker wires to be run onwards easily from the subwoofer directly to the main speakers. The signals from the SubSeries 5*i* to the main speakers are looped through, full-range. This replaces running from the receiver or amplifier to the main speakers. The **High/Speaker Level Inputs** of the SubSeries 6*i* are internally processed through a passive high pass filter (at 6dB/octave below 100Hz) to the **Speaker Level Outputs** of the subwoofer. Connecting the **Speaker Level Outputs** from the subwoofer directly to the main speakers delivers the processed signal, with reduced low frequency content. With less low frequency demands, the main speakers can play louder.

D. Using Multiple Subwoofers (SEE FIGURE 6, page 19)

Particularly in difficult rooms with difficult layouts, using two subwoofers is an alternative to smooth, as well as increase bass response. One subwoofer can be located to increase response, with the second subwoofer located to smooth response. The wiring of two subs in a system is illustrated in Figure 6 (the two subs do not need to be identical). Please refer to Section V, Multiple Subwoofers for further information.

VII. SET-UP CALIBRATION

The following procedure assumes your PSB subwoofer is installed and connected. If possible, work in a team with another person: one listening, one making subwoofer-control adjustments.

A. Set **Sub Volume** to 0, **Sub Cut-Off Frequency** to 50Hz. Set any loudness, bass and treble, and/or equalizer controls on your preamplifier or integrated amplifier or receiver, or other components, to their nominal (midpoint or off) positions. Ensure the LFE Input/Crossover bypass switch is set to off unless the subwoofer is connected to the LFE/Subwoofer output of your receiver/processor and the output is low pass filtered.

B. Play a familiar compact disc, LP, or video soundtrack that includes substantial deep-bass content over an extended section. Your PSB dealer can help you select a few such titles.

C. Gradually turn the **Sub Volume** control clockwise until you achieve natural balance between the subwoofers deep-bass output and your main left and right loudspeakers.

D. Slowly turn the **Sub Cut-Off Frequency** control clockwise to reach the best mid-bass blend with your main left and right speakers. This will be the point at which the upper bass retains solid impact and fullness. Boom or muddiness is the result if the control is too high. A thin, "reedy" quality to the mid-bass such as deep male voices (FM announcers; Darth Vader) is the result if the control is too low.

E. Switch the Phase control between 0° and 180° several times, leaving it in the position that yields the fullest low to mid bass output. You will now probably want to repeat steps C & D to double-check the subwoofer blend.

Cycling through steps C & D several times with slightly different settings of both the **Sub Volume** and **Sub Cut-Off Frequency** controls will help you get the most musical performance from your PSB Subwoofer and your system. The best combination is that which yields the most solid very-low-bass sounds, without mid-bass boom or a gap in response between the subwoofer and the main speakers.

As you will discover, the **Sub Cut-Off Frequency** and **Sub Volume** controls are interactive. Raising the latter while lowering the former can have the effect of extending deep-bass response somewhat, with a small sacrifice in overall loudness capability (this will still be well beyond the full-range loudness capability of most systems). In general, for well-recorded acoustic music the lowest **Sub Cut-Off Frequency** setting that yields a smooth transition between subwoofer and main speakers is often the best choice, and will promote deeper low-bass extension.

Note: The **Sub Volume** control is not a bass-boost or volume control. It is a set-and-forget adjustment, not intended for day-to-day adjustment. Use your preamplifier or receiver/integrated amp tone controls to modify program tonal balance.

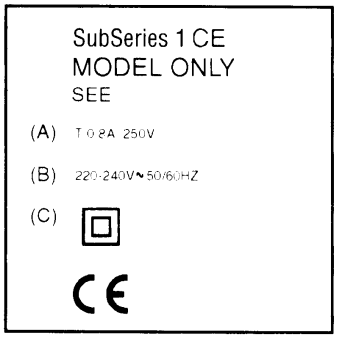
SubSeries 1 / SubSeries 5i / SubSeries 6i

With SUBWOOFER/LFE INPUT

INTEGRATION avec RÉCEPTEUR A/V / ENTRÉE LFE

INTEGRACIÓN con RECEPTOR de AUDIO-VIDEO/ENTRADA LFE

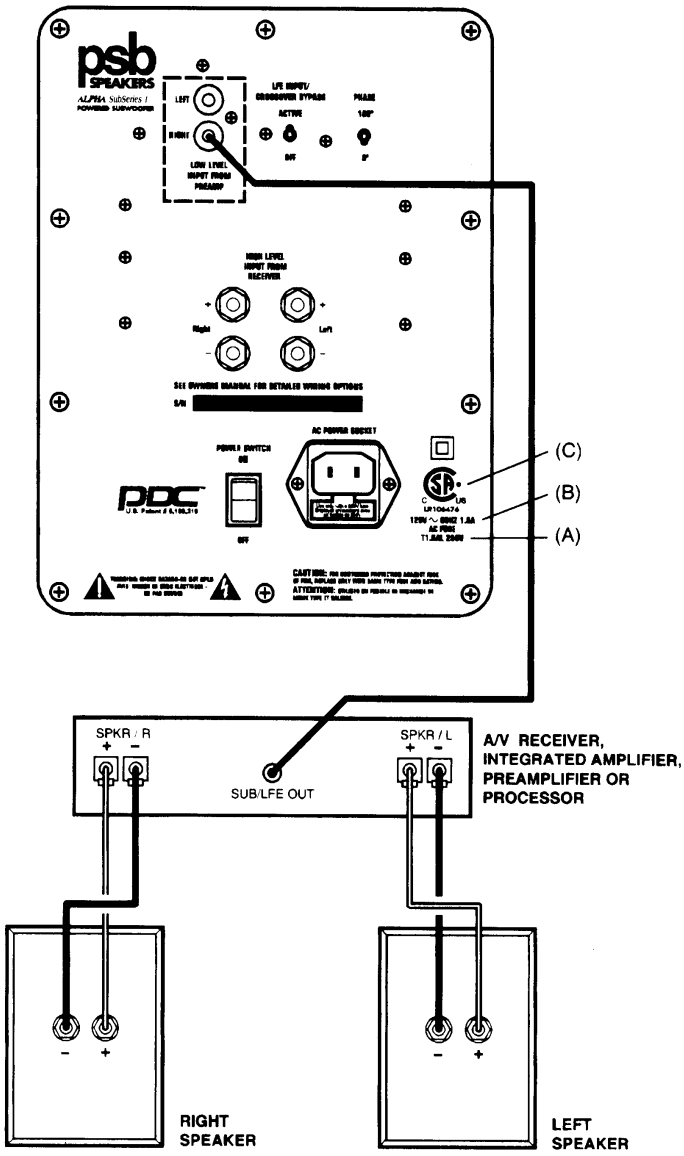
Figure 3



Hook up same for all models—SubSeries 1 Back Plate used for illustration.

Le raccordement est le même pour tous les modèles—Plaque arrière SubSeries 1 utilisée des fins d'illustration.

La conexión es la misma para todos los modelos—Se usa el panel posterior del SubSeries 1 como ilustración.



Use this configuration to connect the subwoofer to an A/V receiver or processor's subwoofer/LFE output. The LFE input/crossover bypass switch should be set to active only if your A/V receiver/processor subwoofer/LFE output is low pass filtered.

Utilisez cette configuration pour raccorder le haut-parleur d'extrême grave à un récepteur A/V ou à la sortie sub/LFE du processeur. L'interrupteur de l'entrée/dérivation du filtre séparateur de fréquences LFE doit être réglé à « active » seulement si votre sortie de récepteur/processeur/caisson de grave LFE est filtrée bas-niveau.

Use esta configuración para conectar el subgrave a un receptor de audio/video o a la salida sub/LFE de un procesador. El interruptor que permite pasar por alto le entrada LFE/red divisora debe ponerse un la posición activa solamente si hay un filtro de paso bajo en la salida para altavoz subgrave del receptorde audio-video/procesador.

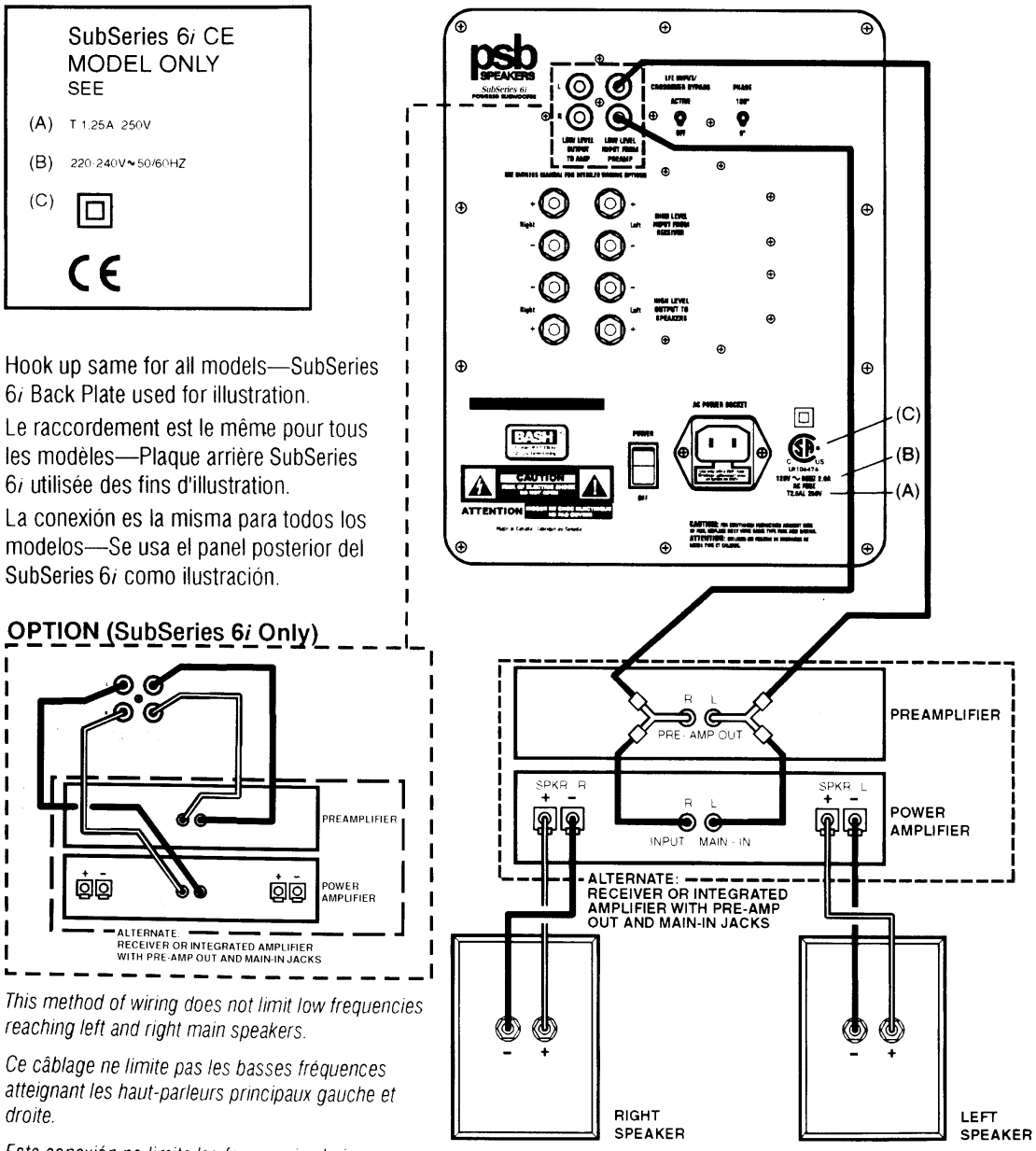
SubSeries 6i / SubSeries 5i / SubSeries 1

With LOW LEVEL INPUT and OUTPUT OPTION

Avec L'OPTION D'ENTRÉE BAS-NIVEAU et de SORTIE BAS-NIVEAU

Con OPCIÓN de ENTRADA y SALIDA a NIVEL BAJO

Figure 4



Hook up same for all models—SubSeries 6*i* Back Plate used for illustration.

Le raccordement est le même pour tous les modèles—Plaque arrière SubSeries 6*i* utilisée des fins d'illustration.

La conexión es la misma para todos los modelos—Se usa el panel posterior del SubSeries 6*i* como ilustración.

This method of wiring does not limit low frequencies reaching left and right main speakers.

Ce câblage ne limite pas les basses fréquences atteignant les haut-parleurs principaux gauche et droite.

Esta conexión no limita las frecuencias bajas que llegan a los altavoces principales derecho e izquierdo.

Low level connections wire the subwoofer to a preamplifier or to the "pre-out" jacks of an integrated amplifier or receiver, using standard RCA cables.

Les raccordements bas-niveau relient le haut-parleur d'extrême grave à un préamplificateur ou aux bornes «sortie préamplificateur» d'un préamplificateur, d'un amplificateur intégré ou d'un récepteur au moyen de câbles RCA standard.

Para conexión al nivel bajo se conecta el subgrave al pre-amplificador o a los conectores "pre salida" de un amplificador integrado o receptor usando cables comunes tipo RCA.

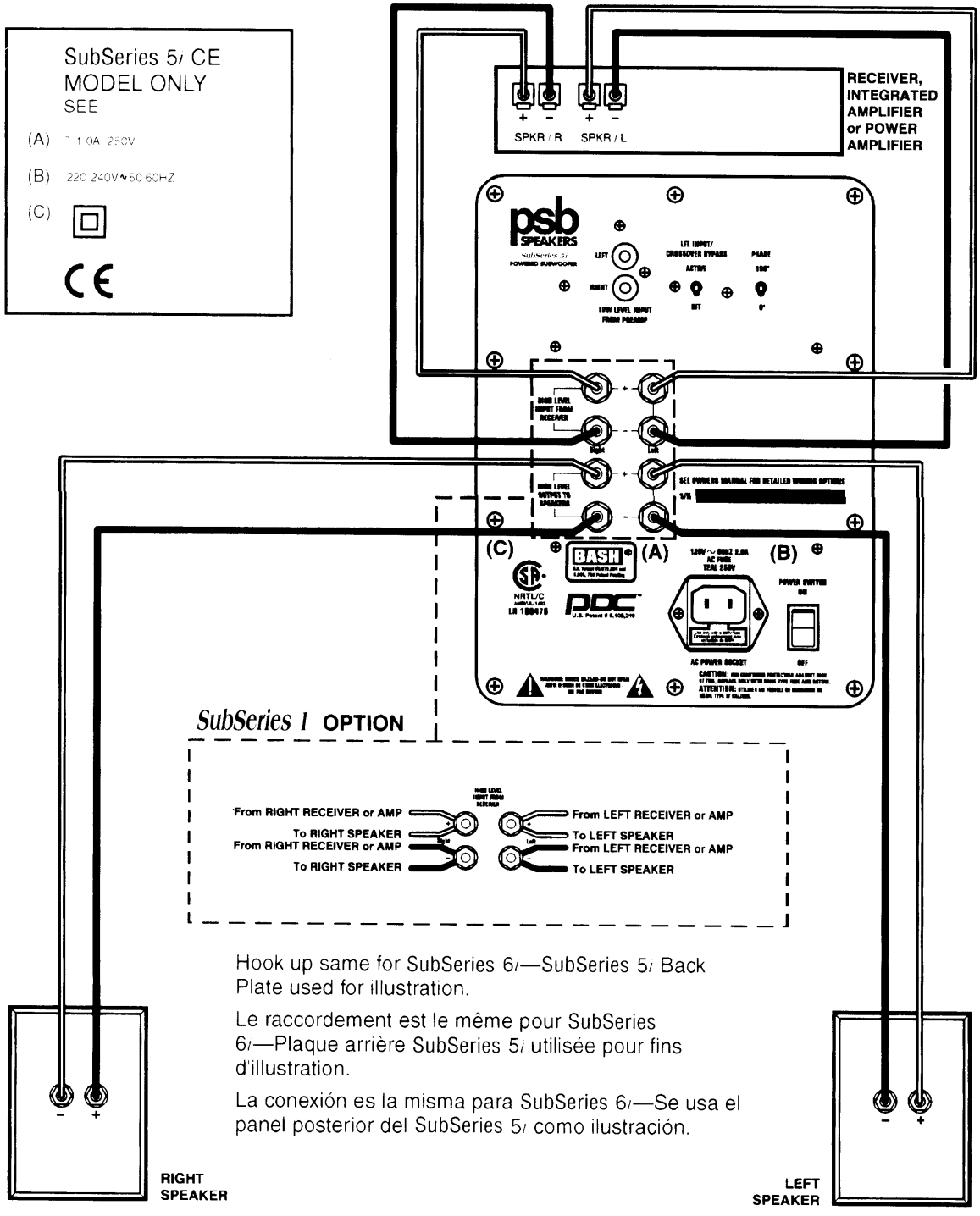
SubSeries 5i /SubSeries 6i /SubSeries 1

With HIGH LEVEL INPUT and OUTPUT

Avec ENTRÉE et SORTIE HAUT-NIVEAU

Con ESTRADA y SALIDA de NIVEL ALTO

Figure 5



Hook up same for SubSeries 6i—SubSeries 5i Back Plate used for illustration.

Le raccordement est le même pour SubSeries 6i—Plaque arrière SubSeries 5i utilisée pour fins d'illustration.

La conexión es la misma para SubSeries 6i—Se usa el panel posterior del SubSeries 5i como ilustración.

High level connections wire the subwoofer to the speaker output terminals of a receiver or amplifier, just as if the subwoofer was a pair of speakers.

Les connexions haut-niveau relient le haut-parleur d'extrême grave aux bornes de sorties h.-p. d'un récepteur ou d'un amplificateur, comme s'il s'agissait d'une paire d'enceintes acoustiques.

Para conexión al nivel alto se conecta el subgrave a las terminales de salida para altavoz de un receptor o amplificador como si se tratase de un par de altavoces.

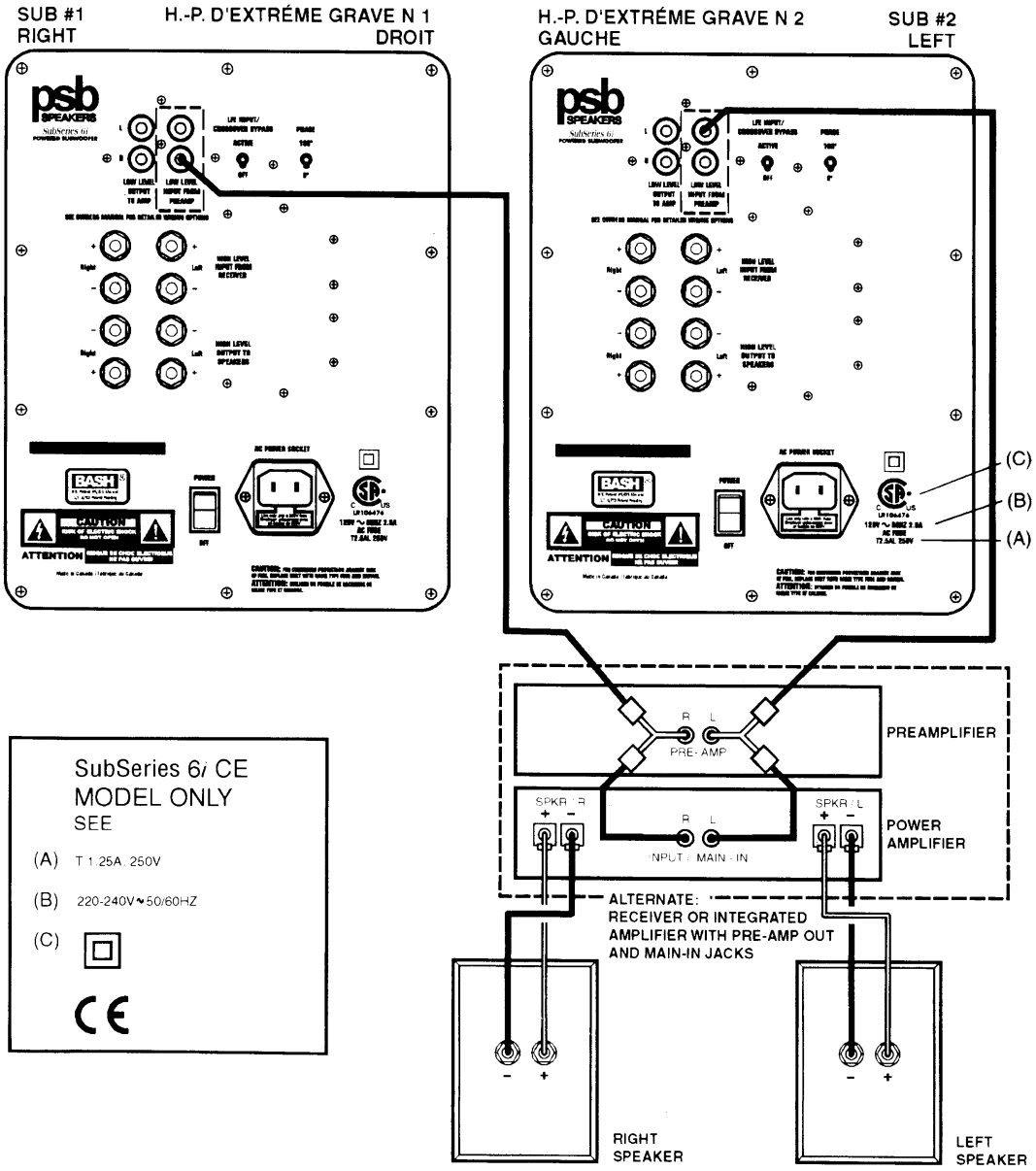
SubSeries 6i /SubSeries 5i /SubSeries 1

With LOW LEVEL INPUT to TWO SUBWOOFERS

Avec ENTRÉE BAS-NIVEAU vers DEUX H.-P D'EXTRÊME GRAVE

Con ENTRADA de NIVEL BAJO a DOS SUBGRAVES

Figure 6



Hook up same for all models—SubSeries 6*i* Back Plate used for illustration.

Le raccordement est le même pour tous les modèles—Plaque arrière SubSeries 6*i* utilisée pour fins d'illustration.

La conexión es la misma para todos los modelos—Se usa el panel posterior del SubSeries 6*i* como

For this type of connection two RCA "Y" adapters are required to be plugged into the pre-out jacks of a preamplifier or integrated amplifier or receiver.

Pour ce genre de connexion, il faut brancher deux adaptateurs en <<Y>> RCA sur les prises de sortie d'un préamplificateur, d'un amplificateur intégré ou d'un récepteur.

Para esta conexión se necesita enchufar dos adaptadores RCA tipo "Y" a los conectores de salida de un preamplificador, amplificador integrado o receptor.

VIII. SPECIFICATIONS

	SubSeries 1	SubSeries 5*i*	SubSeries 6*i*
FREQUENCY RANGE	(Anechoic Chamber)		
Response			
On Axis @ 0° ±3dB	**36-150Hz**	**30-150Hz**	**29-150Hz**
LF Cutoff –10dB	32Hz	27Hz	26Hz
AMPLIFIER POWER—INTERNAL	(RMS, Clipping <10% Time)		
Continuous	110 Watts	150 Watts	225 Watts
Dynamic	**140 Watts**	**225 Watts**	**325 Watts**
Peak	280 Watts	450 Watts	650 Watts
Type	**Class AB**	**Class H/BASH**	**Class H/BASH**
	Discrete MOSFET	Discrete MOSFET	Discrete MOSFET
	Output Devices	Output Devices	Output Devices
ACOUSTIC DESIGN			
Woofer	**8" (203mm)**	**10" (250mm)**	**12" (300mm)**
	Polypropylene Cone	Polypropylene Cone	Polypropylene Cone
	Rubber Surround	Rubber Surround	Rubber Surround
	1½" (38mm) Voice Coil	1½" (38mm) Voice Coil	2" (50mm) Voice-Coil
	28 oz (794g) Magnet	28 oz (794g) Magnet	53 oz (1503g) Magnet
	+20 oz (567g) Shielding Magnet	+28 oz (794g) Shielding Magnet	
Crossover	**Variable 50Hz-150Hz**	**Variable 50Hz-150Hz**	**Variable 50Hz-150Hz, LR4**
	24dB/octave Linkwitz-Riley	24dB/octave Linkwitz-Riley	24dB/octave Linkwitz-Riley
	Low Pass Filter	Low Pass Filter	Low Pass Filter
Internal Volume	**0.68 cu ft (19.3 liter)**	**1.01 cu ft (28.6 liter)**	**2.38 cu ft (67 liter)**
Design Type	**Bass Reflex**	**Bass Reflex**	**Bass Reflex**
	1 x 8" Front Duct (25mm x 203mm)	2 x 2" Front Ports (508mm)	2 x 2 5/8" (66.7mm) Front Ports
	Radiused Externally	Radiused Internally and Externally	Radiused Internally and Externally
	Video Shielded	**Video Shielded**	
SIZE	(W x H x D)		
	9 5/8 x 13 1/4 x 14 1/2"	**12 3/8 x 16 1/2 x 14 7/8"**	**15 x 19 7/8 x 19 1/4"**
	244 x 337 x 368mm	314 x 419 x 378mm	381 x 505 x 489mm
	Plus 1" (25mm) Feet	Plus 7/8" (22mm) Feet	Plus 1" (25mm) Feet
WEIGHT			
Net	**23.5 lb (10.8kg)/each**	**31 lb (14kg)/each**	**46lb (20.9kg)/each**
Shipping	27.5 lb (12.6kg)/each	34 lb (16kg)/each	54lb (24.6kg)/each
FINISH	**Black Textured, Sienna or Maple Vinyl Veneer**	**Black Ash Vinyl**	**Black Ash Vinyl**
CONNECTIONS	**Low/Line Level/LFE Input**	**Low/Line Level/LFE Input**	**Low/Line Level/LFE Input and Output**
	High/Speaker Level Input	High/Speaker Level Input	High/Speaker Level Input
		and Output	and Output
			80 Hz High Pass Filter
			12 dB/octave Butterworth
			High Level High Pass
			6 dB/octave Filter
FEATURES	**Front Mounted Volume and Crossover.**	**Front Mounted Volume and Crossover.**	**Front Mounted Volume and Crossover.**
	Phase, Crossover Bypass and On-Standby/Off	**Phase, Crossover Bypass and On-Standby/Off**	**Phase, On-Standby/Off**
	5-way Binding Posts and Gold-plated RCAs	**5-way Binding Posts and Gold-plated RCAs**	**5-way Binding Posts and Gold-plated RCAs**
			Feet with Adjustable Spikes & Rubber Levelers
	NRTL/C LR 105476 or CE	NRTL/C LR 105476 or CE	NRTL/C LR 105476 or CE
POWER			
Input	**120V, 60Hz 220-240, 50/60Hz**	**120V, 60Hz 220-240V, 50/60Hz**	**120V, 60Hz 220-240V, 50/60Hz**
Fuse	**1.6A, 250V T0.8A, 250V,** * 5mm x 20mm	**2.0A, 250V T1.0A, 250V,** * 5mm x 20mm	**2.5A, 250V T1.25A, 250V,** * 5mm x 20mm

*Manufactured by Littlefuse Type 313 or Equivalent

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Enregistrez votre garantie sur Internet dès maintenant et courrez la chance de gagner des enceintes PSB.
Visitez le : www.psbspeakers.com/warranty

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GARANTIE LIMITÉE

PSB Speakers, une division de Les Industries Lenbrook Limitée, garantie les produits ci-après pour la durée indiquée.

Produits
Enceintes acoustiques et haut-parleurs d'extrême grave asservis

Durée de la garantie
Tous les haut-parleurs PSB et les caissons de graves extrêmes sont garantis 5 ans. Les amplificateurs PSB, y compris ceux utilisés dans nos « haut-parleurs actifs » (tels que les caissons de graves extrêmes) sont garantis 1 an.

Étendue de la garantie
Sous réserve des dispositions ci-après, la présente garantie couvre les pièces et la main-d'œuvre en vue de corriger tout vice de matériau et de fabrication. Sont exclus de la présente garantie :

1. tout dommage, dégradation, mauvais fonctionnement ou défaillance résultant des situations suivantes :
   a. accident, cas de force majeure, mauvaise utilisation, négligence au modification intempestive du produit ;
   b. installation, enlèvement out entretien incorrect et manquement à se confirmer aux directives fournies pour le produit ;
   c. réparation ou tentative de réparation par quiconque n'est pas autorisé par PSB Speakers à réparer le produit ;
   d. envoi du produit (la demande d'indemnisation doit être adressée au transporteur) ;
   e. toute cause autre qu'une défectuosité du produit.
2. le nettoyage, l'installation initiale, une vérification ne permettant pas de détecter de défectuosité ou les frais engagés pour l'installation, l'enlèvement ou la réinstallation du produit.
3. les produits dont le numéro de série a été effacé, modifié ou enlevé.
4. les accessoires, y compris, sans s'y limiter, les câbles, les accessoires d'installation et supports et les cordons d'alimentation détachables.
5. les produits utilisés à des fins commerciales ou dans une application industrielle ou commerciale.
6. tout produit acheté à l'extérieur du pays dans lequel la réparation est demandée, y compris les possessions et les territoires de ce pays.
7. tout autre problème qui ne constitue pas un vice du produit.
8. Pour tout produit non acheté auprès d'un revendeur agréé PSB Speakers. Si vous n'êtes pas certain qu'un revendeur est « agréé », vérifiez sur notre liste de revendeurs ou appelez PSB Speakers.

Titulaire de la présente garantie
La présente garantie est accordée uniquement à l'acheteur initial.

Notre contribution
Nous payons tous les frais de main-d'œuvre et de matériau pour les articles couverts par la garantie ; les frais d'expédition sont abordés dans la prochaine rubrique de la présente garantie.

Pour obtenir le service après-vente

1. Se votre produit doit être réparé, veuillez l'apporter à votre dépositaire PSB Speakers en prenant soit d'apporter également votre facture ou acte de vente original. Si vous avez besoin d'aide pour connaître l'identité de votre dépositaire PSB Speakers, veuillez visiter le site web de PSB Speakers ou communiquez directement avec celle-ci.
2. Vous devez acquitter tous les frais d'expédition si votre produit doit être expédié en vue de le faire réparer. Cependant, si les réparations nécessaires sont couvertes par la garantie, nous paierons tous les frais d'expédition de retour vers n'importe quelle destination à l'intérieur du pays dans lequel la réparation est demandée.
3. Lorsqu'une réparation sous garantie est demandée, vous devez produire l'acte de vente original, la facture ou une autre preuve d'achat daté.

Limite des garanties implicites
Toutes les garanties implicites, y compris les garanties de qualité marchande et d'aptitude à un but particulier, sont limitées à la durée de la présente garantie.

Exclusion des dommages
La responsabilité de PSB Speakers à l'égard de tout produit défectueux se limite à la réparation ou au remplacement du produit, au gré de PSB Speakers. PSB Speakers ne peut être tenue responsable des dommages causés à tout autre produit par suite de la défectuosité des produits PSB Speakers, ni des dommages résultant des désagréments ou pertes d'utilisation du produit, ni d'autres dommages, directs, indirects ou autres.

Les lois de l'état (ou de la province) au regard de la présente garantie

Certains états et certaines provinces n'autorisent pas les clauses limitant la durée des garanties tacites ou l'exclusion des dommages indirects ou accessoires, ou l'une et l'autre. Par conséquent, il est possible que les clauses restrictives ou exclusives ci-dessus ne s'appliquent pas à vous.

La présente garantie vous accorde des droits légaux précis ; il se peut que vous en ayez d'autres, qui peuvent varier d'un état (ou d'une province) à un autre.

La présente garantie ne s'applique que dans le pays où le produit a été acheté, incluant ses possessions et territoires.

Conservez cet énoncé de garantie, incluant la date d'enregistrement et votre preuve d'achat, dans vos dossiers.

Register Your Warranty Online Now for a chance to win PSB speakers. Visit: www.psbspeakers.com/warranty

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LIMITED WARRANTY

PSB Speakers, a division of Lenbrook Industries Limited, warrants the following products for the periods indicated:

Products
Loudspeakers and Powered Subwoofers

How Long Does the Warranty Last?
All PSB loudspeakers and subwoofer drivers have a 5-year warranty. PSB amplifiers, including the amplifiers used in our "powered speakers" (such as powered subwoofers) have a 1 year warranty.

What is Covered and What is Not Covered?
Except as specified below, this warranty covers parts and labor to correct all defects in materials and workmanship. The following are not covered by the warranty:

1. Damage, deterioration, malfunction or failure to meet performance specifications resulting from:
   a) Accident, acts of nature, misuse, abuse, neglect or unauthorized product modification.
   b) Improper installation, removal or maintenance, or failure to follow instructions supplied with the product.
   c) Repair or attempted repair by anyone not authorized by PSB Speakers to repair the product.
   d) Any shipment of the product (claims must be presented to the carrier).
   e) Any cause other than a product defect.
2) Cleaning, initial set-up, check-ups with no defects found, or charges incurred for installation, removal or reinstallation of the product.
3) Any product on which the serial number has been defaced, modified, or removed.
4) Accessories, including but not limited to, cables, mounting hardware and brackets, and detachable power cords.
5) Any product used in any trade or business or in an industrial or commercial application.
6) Any product purchased outside the country of service, its possessions or territories.
7) Any problem other than a product defect.
8) Any product not purchased from an authorized PSB Speakers Dealer. If you're not sure a dealer is "authorized", check our dealer locator or call PSB Speakers.

Who May Enforce the Warranty?
This warranty may be enforced only by the original purchaser.

What We Will Pay For
We will pay for all labor and material expenses for items covered by the warranty. Payment of shipping charges is discussed in the next section of this warranty.

How You Can Get Service
1) If your unit needs service, please take your speaker with the original invoice or bill of sale to your PSB Speakers dealer. If you need assistance locating a PSB dealer please look on PSB's internet website or contact PSB directly.
2) You must pay any shipping charges if it is necessary to ship the product for service. However, if the necessary repairs are covered by the warranty, we will pay the return shipping charges to any destination within the country of service.
3) Wherever warranty service is required, you must present the original dated sales receipt, invoice, or other proof of purchase.

Limitation of Implied Warranties
All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

Exclusion of Damages
PSB Speakers' liability for any defective product is limited to repair or replacement of the product at PSB's option. PSB shall not be liable for damage to other products caused by any defects in PSB's products, damages based upon inconvenience or loss of use of the product, or any other damages, whether incidental, consequential, or otherwise.

How State (Provincial) Law Relates to the Warranty
Some states do not allow limitations on how long in implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty give you specific legal rights, and you may also have other rights, which vary, from State (Province) to State (Province).

This warranty is enforceable only inside the county of purchase, its possessions or territories.

Keep this warranty statement including the registration date with your proof of purchase for your records.